



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,206	03/19/2004	Tomoya Sanuki	016907-1634	6536
22428	7590	06/15/2005	EXAMINER	
FOLEY AND LARDNER SUITE 500 3000 K STREET NW WASHINGTON, DC 20007			VU, HUNG K	
			ART UNIT	PAPER NUMBER
			2811	

DATE MAILED: 06/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/804,206	Applicant(s) SANUKI, TOMOYA	
	Examiner Hung Vu	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 29 March 2005.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 1-11, 14, 16 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12, 13, 15, 17-19 and 21-24 is/are rejected.
- 7) ☒ Claim(s) 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 12, 13, 15, 19 and 21-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Cherne et al. (H1435).

Cherne et al. discloses, as shown in Figures 5-16 (especially Figures 7-10 and 13), a semiconductor device comprising:

a semiconductor substrate (SOI,SOS);

a first element region formed in the semiconductor substrate, a gate electrode (21) being provided on the first element region, source and drain regions (16,18) being formed in the first element region;

an element isolation region (13) provided around the first element region;

recesses formed in opposing side surfaces of the first element region, the element isolation region being formed in the recesses, each recess formed between projections (51,52) of the first element region.

Regarding claim 13, Cherne et al. discloses the opposing side surfaces of the first element region oppose each other in a direction of a channel length [Figures 2, 3, 9, 10, 13-16].

Art Unit: 2811

Regarding claim 15, Cherne et al. discloses a length of the recesses in a direction of a channel width is longer than a distance between the first element region and a second element region (61,63) provided separate from the first element region in the direction of the channel width.

Regarding claim 19, Cherne et al. discloses the semiconductor device is a N-type semiconductor device.

Regarding claim 21, Cherne et al. discloses the recesses are formed to recess toward an inside of the first element region.

Regarding claim 22, Cherne et al. discloses the recesses are formed close to the gate electrode.

Regarding claim 23, Cherne et al. discloses the projections are provided on both ends of one of the side surfaces.

Regarding claim 24, Cherne et al. discloses, as shown in Figures 5-16 (especially Figures 7-10 and 13), a semiconductor device comprising:

- a semiconductor substrate (SOI, SOS);

- a first element region formed in the semiconductor substrate, a gate electrode (21) being provided on the first element region, source and drain regions (16,18) being formed in the first element region;

first and second projections (51,61) provide on one of opposing side surfaces of the first element region and made of the same material as the first element region;

third and forth projections (52,63) provided on another one of the opposing side surfaces and made of the same material as the first element region;

an element isolation region (13) provided around the first element region and the projections.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cherne et al. (H1435) in view of Suzuki et al. (PN 5,663,588, of record).

Cherne et al. discloses the claimed invention including the semiconductor device as explained in the rejection above. Cherne further discloses the element isolation region is formed of oxide dielectric. Cherne et al. does not disclose oxide dielectric is SiO<sub>2</sub>. However, Suzuki et al. discloses an element isolation region (16) is SiO<sub>2</sub>, which having a lower thermal expansion coefficient than a material (Si) of the first element region. Note Figures 1A, 1B, 8A and 8B. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the element isolation region of Cherne et al. being SiO<sub>2</sub>, such as taught by Suzuki et al., since SiO<sub>2</sub> is easier to reflow and commonly used as the element isolation region.

*Allowable Subject Matter*

3. Claim 25 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The following is an examiner's statement of reasons for allowance:

Applicant's claim 25 is allowable over the references of record because none of these references disclose or can be combined to yield the claimed device having the first and second projections provided on both ends of one of the side surfaces, and the third and fourth projections provided on both ends of the another one of the side surface.

*Response to Arguments*

5. Applicant's arguments with respect to claims 12 and 24 have been considered but are moot in view of the new ground(s) of rejection.

*Conclusion*

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 2811

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

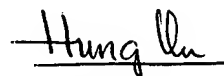
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (571) 272-1666. The examiner can normally be reached on Mon-Thurs 6:00-3:30, alternate Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (571) 272-1732. The Central Fax Number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

January 10, 2005

  
Hung Vu

Primary Examiner